

# ARCH A104: INTRODUCTION TO FRAMECAD STEEL FRAMING

Item	Value
Curriculum Committee Approval Date	03/09/2022
Top Code	020100 - Architecture and Architectural Technology
Units	1 Total Units
Hours	18 Total Hours (Lecture Hours 18)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

## Course Description

Introduction to FrameCAD Steel Framing is an overview of integrated steel panelization design and fabrication. Instruction includes entry level use of FrameCAD Structure and FrameCAD Detailer software as well as file export to FrameCAD Factory and machine. The class will produce and assemble a small sample project using the OCC FrameCAD F325iT. Transfer Credit: CSU.

## Course Level Student Learning Outcome(s)

1. Completers will be able to design, manufacture, and safely assemble a small steel frame project using FrameCAD software, an impact drill, and receiving output from a FrameCAD machine.
2. Completers will have a general knowledge of steel frame panelization design and manufacturing capabilities and basic knowledge of steel framing design considerations and codes.

## Course Objectives

- 1. Recognize the basic procedures, codes, and components for steel framing and panelization.
- 2. Create a small structure using FrameCAD Structure and FrameCAD Detailer software systems at a beginner level.
- 3. Demonstrate how to export a design file to the FrameCAD machine for fabrication and demonstrate safe work area procedures in and around the FrameCAD machine and lab work areas.

## Lecture Content

A. Industry overview on steel framing and panelization1. Cold Form Steel (CFS) definition, ASTM2. Framing shapes, conventional framing3. Benefits of custom fabrication. Less than 1% wasteb. Less material transport tripsc. Reduced labor forced. Less skilled labore. Increased strengthf. No termites, no fireg. Quicker assembly B. Design considerations1. Integrated engineering design2. Spacing3. Thermal bridging4. Insulation5. Sheathing options C. Code and permitting

overview for steel frame construction1. Prescriptive vs code tables2. Structure calculations3. Loads and locational settingsPage 2 of 4ARCH A104-Intro to FrameCAD Steel Framing3. Loads and locational settings4. Bracing methods D. FrameCAD Structure software1. Overview2. Tutorial for a small project E. FrameCAD Detailer software1. Overview2. Machine config settings3. Continuation of Tutorial F. Exporting xml files to FrameCAD Factory software1. Saving and naming project2. File formats3. Export xml to machine G. Review final project and exit survey1. Review final project2. Discuss transport and bolt down procedures3. Discuss project process4. Take final survey Machine and Workspace Safety1. 440 Power safety, generator2. Workspace safety zones3. Decoiler, Machine4. Output area safety5. Eye projection and gloves, shoes6. Production safety Panel completion and assembly1. Workspace safety2. Drill operation and safety3. Screw types and use4. Safe carry and material movement5. Assembling panels Review final project - Discuss photograph

## Method(s) of Instruction

- Lecture (02)

## Instructional Techniques

Instructional methods will include: lecture, lecture-demonstrations, class discussions, video tutorials, video demonstrations, tour of facilities and projects on-site, hands on demonstrations and practice, and guided production and assembly of parts.

## Reading Assignments

A. FrameCAD manuals will be provided via PDF for students to review and reference during class and students will be shown how to access the in-program tutorials and references. B. Students will design and digitally draft a small project using FrameCAD Structure software and will run analysis software on the design. C. Students will configure FrameCAD Detailer and import their project from FrameCAD Structure into FrameCAD Detailer. D. Students will transfer their file to the FrameCAD Factory software for manufacture. One project will be produced and assembled by the class.E. Students will take an exit survey with questions and a written statement.

## Writing Assignments

A. Student will write a brief statement as part of their exit survey.

## Out-of-class Assignments

A. Students will be assigned to research and confirm windows and door openings or other apertures and components needed to be located in their FrameCAD project. B. Students will be assigned to research online city code and planning requirements for a proposed (hypothetical) project and comply with applicable rules for their project. C. Students will be assigned to summarize their findings and collect their notes and documents into a project folder. Students will also print out their project reports and panel drawings to include in this project reference folder. Out of class readings, assignments, and written work will total approximately 2-3 hours per week (or about 36 hours total).

## Demonstration of Critical Thinking

Critical thinking will be engaged in the process of applying steel frame knowledge to a project that will be input and developed in design and engineering software. Students will need to make critical decisions and adjustments for the project to pass the software engineering testing.

## Required Writing, Problem Solving, Skills Demonstration

A. Problem solving and skills will be demonstrated by the development of a project file for manufacture on the machine. Success will be if the

project can be read by the machine or if the student can determine what parameters need to be adjusted for the file to run. B. Students will assemble a small project produced by the machine and demonstrate safe working around the machine and workspace, and proper operation of an impact drill. C. Students will collect and organize notes, handouts, research materials, project print outs and all relevant documents into a resource notebook.

## **Eligible Disciplines**

Architecture: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Construction management: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Engineering: Master's degree in any field of engineering OR bachelor's degree in any of the above AND master's degree in mathematics, physics, computer science, chemistry, or geology OR the equivalent. (NOTE: A bachelor's degree in any field of engineering with a professional engineer's license is an alternative qualification for this discipline.) Master's degree required. Title 5, section 53410.1

## **Manuals Resources**

1. FrameCAD. FrameCad Structure Procedures Overview, FrameCAD Limited , 03-01-2017 2. FrameCAD. Detailer Configuration Quick Start, FrameCAD Limited , 03-01-2017 3. FrameCAD. Detailer Plus User Manual, FrameCAD Limited , 03-01-2017